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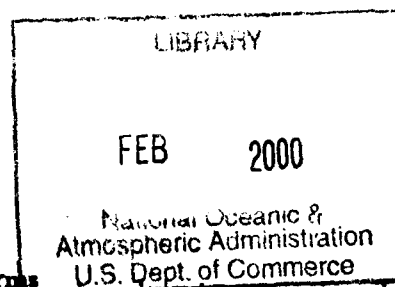
INDIA WEATHER REVIEW, 1941

ANNUAL SUMMARY

PART C  
STORMS AND DEPRESSIONS

CONTENTS

	Page.		Page.
Depressions and Cyclonic Storms . . .	C 1	Local Storms	C 7
Western Disturbances . . . . .	C 6		



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# INDIA WEATHER REVIEW, 1941.

## ANNUAL SUMMARY.

### PART C.

#### STORMS AND DEPRESSIONS.

##### DEPRESSIONS AND CYCLONIC STORMS.

During the year 6 storms and 8 depressions formed in the Bay of Bengal, one storm and one depression in the Arabian Sea and two depressions over land. The dates on which the storms were in existence and the greatest barometric depths observed during their life are summarised in Table I below :—

TABLE I.

Region.	Month.	Date.	Greatest observed barometric depth.
			Inch
Bay of Bengal . . . .	May . . . . .	21st to 27th . . . .	0.51
Arabian Sea and Bay of Bengal.	May-June . . . . .	24th May-5th June . .	0.27
Bay of Bengal . . . .	July . . . . .	6th to 13th . . . . .	0.33
Bay of Bengal . . . .	August . . . . .	7th to 14th . . . . .	0.40
Bay of Bengal . . . .	August . . . . .	15th to 22nd . . . . .	0.37
Bay of Bengal and Arabian Sea.	Nov-Dec. . . . .	29th Nov.-6th Dec. . .	0.81
Bay of Bengal . . . .	December . . . . .	8th to 15th . . . . .	0.33

Detailed descriptions of these storms and depressions are given first and these are followed by lists of western disturbances and the more important local storms during the year.

**1. Severe Cyclonic Storm in the Bay of Bengal from the 21st to 27th May 1941.**—An advance of the southwest monsoon occurred in the south Bay of Bengal on the 20th of May. Weather became unsettled in the north Andaman Sea by the morning of the 21st and a depression formed there within the next 24 hours. On the morning of the 22nd the depression was centred near Lat.  $13^{\circ}\text{N}$ ., Long.  $95^{\circ}\text{E}$ . and the winds at upper levels upto 1.5 kms. showed a cyclonic circulation. At 1 hr. of the 23rd, pressure along the Tenasserim coast showed a rise while Diamond Island recorded a fall of pressure. The surface winds indicated the central region of the depression to be near Lat.  $14\frac{1}{2}^{\circ}\text{N}$ ., Long.  $94^{\circ}\text{E}$ . By this time the weather had also deteriorated on the south Arakan coast and improved in south Tenasserim, indicating a northward march of the depression. The depression deepened and was centred at 8 hrs. of the 23rd near Lat.  $15^{\circ}\text{N}$ ., Long.  $93\frac{1}{2}^{\circ}\text{E}$ ., and at 17 hrs. of the same day was near Lat.  $15\frac{1}{2}^{\circ}\text{N}$ ., Long.  $93^{\circ}\text{E}$ . It moved northwestwards and by 8 hrs. of the 24th had intensified into a cyclonic storm centred near Lat.  $17^{\circ}\text{N}$ ., Long.  $92\frac{1}{2}^{\circ}\text{E}$ . Moving rapidly in a north-northwesterly direction the storm was centred near Lat.  $20\frac{1}{2}^{\circ}\text{N}$ ., Long.  $91^{\circ}\text{E}$ . at 8 hrs. of the 25th. On the evening of the same day the centre was near Lat.  $22^{\circ}\text{N}$ ., Long.  $90\frac{1}{2}^{\circ}\text{E}$ .; the surface winds of Barisal, Noakhali and Chittagong did not exceed force 5 and those at other observatories to the west of Barisal were not influenced by the cyclonic storm at all. Apparently the cyclonic storm had a very small core. Thereafter, the storm began to recurve towards NNE and there was a rapid fall of pressure around the Meghna estuary. By 22 hrs. of the 25th the cyclonic storm was centred on the Tetulia river, between Barisal and Bhola, and thereafter passed over the north of Bhola, but very close to it. Although anemometer readings are lacking, there is no doubt, from the widespread havoc and structural damage caused by the cyclone, that it was severe. Thereafter recurring slightly to north-northeast the severe cyclonic storm was centred at 2 hrs. of the 26th about midway between Barisal and Noakhali. The pressure defect at Barisal was  $-510''$  being the largest defect observed during this storm. It passed inland on the morning of the 26th and was near Comilla at 14 hrs. Later on it weakened rapidly and filled up by the morning of the 27th.

According to reports of eye witnesses, published in the newspapers, the cyclonic storm caused severe devastation. The sub-division of Bhola was the region worst affected.

Winds of gale and then hurricane force, raging for a period of about 12 hours on the night of the 25th-26th May, caused immense damage to houses, huts and trees. In some places almost all the dwelling places were razed to the ground, while the coconut and betel-nut palms, which formed the main source of income of the people, were destroyed *en masse*. A tidal wave which came with the cyclonic storm submerged large portions of the Bhola town, to a height of 5' to 10' and washed away men and cattle and provisions stocked in houses. The number of deaths due mainly to the flood was estimated at nearly 5000 by some reporters, while the loss in cattle was very large. A good number of boats were wrenched from their moorings from the banks of the rivers and washed away. The total area which suffered damage due to the cyclonic storm was about 3000 square miles including the eastern parts of the Backerganj district, the islands in the mouth of the Meghna, the western parts of the district of Noakhali and some parts of Tippera. The total loss was estimated to be over a crore of rupees. According to some, the flood water was very warm at some places. It was reported that sounds of "goom goom" like distant cannonade were heard by many people before the onrush of the flood over land.

*Extract from the Weather Diary kept by the Noakhali observer.*—"25th—Distant lightning observed on the southern horizon 0130/0200 (hrs. I.S.T.). Slight thunder followed by slight rain 0500/0700. Light breeze from SE in the early morning; changed direction to W in the morning. After 15 hrs., wind direction changed to NE and began to rise in force and at 17 hrs. it rose to 5 and sky was completely overcast with As and Fb. Wind force rose higher and higher accompanied by slight to moderate continuous rain; at 20 hrs. a regular gale with force 8 or 9 began to blow accompanied by moderate rain..... The damage was so widespread that entire roofs (intact) of many houses were blown away to a considerable distance. Not a single house of the locality remained undamaged. The wind instruments and the danger signal (burning lamps) of the local observatory were seriously damaged, the latter being completely destroyed. The gale gradually changed direction to east and the wind was so strong that it was impossible to walk against the wind, and even to come out of dwelling houses on account of constant fall of large trees and sheds. The local observer in spite of his best endeavour failed to reach the observatory to attend special duty. Within living memory such a strong gale was not experienced. 26th—From the previous evening the strong gale continued..... By the morning, this changed direction to SE..... Torrential rain accompanied the gale..... In the morning at 0630 hrs. to 0730 hrs. the wind rose to its maximum force (about 11). By 1230 hrs. this gradually subsided changing the direction to SW but nevertheless the sky remained overcast till 17 hrs. The gale began on the previous evening from NE and it completed a semicircle from northeast-east-southeast south-southwest. The fury of the wind was greatest in the morning. After 17 hrs. the sky partly cleared for sometime, lightning with slight thunder and rain occurred from 19/23-10. The sky remained dark and gloomy till midnight."

*Report on the cyclone which passed over Bhola on 25th May 1941 by Mr. P. N. Banerji, Assistant Headmaster of Bhola Town School.*—"On 25th May 1941 there was intermittent moderate rain without any marked activity of the cloud in the morning. The wind speed at this time was not more than 3 or 4 miles an hour. This continued upto about 5 p.m., when the sky became overcast with dark, heavy clouds and the weather became squally. Intermittent heavy rain with strong wind force 7 from the east continued upto 9 p.m. The cyclone started at about 9 p.m. from SE and continued upto about 00-30 A.M. The wind speed during this time according to estimation would not have been less than 100 miles per hour. The cyclone was all along attended with heavy rain."

At about 00-30 a.m. there was a temporary lull which lasted for about half an hour. Then the cyclone began again at 1 a.m. and severe wind was experienced from SW, and this condition continued upto 8 a.m., next day (26th May 1941). The wind speed during this time was even greater and the major part of the havoc was done at this time. After 8 a.m. however the wind speed sufficiently decreased and it was not more than force 3, but the sky was overcast. During the latter part of the cyclone the colour of the cloud was observed to be reddish-brown. Another feature of the cyclone was the absence of lightning and thunder.

During the cyclone at about 2 a.m. on 26th May 1941 there was a heavy onrush of water causing a severe flood, as a result of which water rose to a height of 6 or 7 ft. in the Bhola town itself and it is not unlikely that in the low lands in the neighbourhood of the town the water rose to about 10 to 12 ft.

The cyclone was of unparalleled severity. The cyclone together with the flood created widespread havoc in the whole Bhola Sub-Division. The worst fury of the cyclone was experienced in the southern side of the Sub-Division. In the Bhola town 95 per cent. of the houses were blown away and the rest of the houses seriously damaged....."

The district averages of rainfall and some particularly heavy falls of rain are given below.

TABLE 2.

District.	DISTRICT AVERAGES RECORDED ON			Particularly heavy falls.
	25th	26th	27th	
Backerganj . . .	1.7	2.9	..	Barisal 9.6" and Patuakhali 6.4" on 26th.
Chittagong . . .	..	2.1	..	....
Noakhali . . .	3.0	2.6	..	Noakhali 8.7" on 26th.
Lushai Hills . . .	..	..	5.3	Lungleh 9.4", Sherkawn 10.2" and Siolsuk 7.4" on 27th.

**2. Severe Cyclonic Storm of 24th May to 5th June 1941 in the Arabian sea and the Bay of Bengal.**—A temporary advance of the southwest monsoon appeared in Ceylon and Malabar on the 22nd May as was indicated by the heavy rain at Colombo (six inches during the previous night) and the strengthening of southwesterly upper winds at Minicoy. On the night of the 22nd there was locally heavy rain in Malabar, Calicut recording 5" and Cochin 7". Pressure began to fall on the Malabar coast from the evening of the 23rd and conditions were unsettled off Malabar-Kanara coasts from the 23rd. By the morning of 25th the negative pressure departures on the west coast increased, Mangalore showing a defect of pressure of 0.14 inches. The rainfall was nearly general along the coast. The upper winds at Minicoy which had strengthened since the 22nd were westerly. The upper winds at Trivandrum at the only available level (0.5 km.) was strong SW and at Mangalore was moderate to strong between SSE and SSW. These observations indicated the formation of a depression with its central region near Lat. 11°N., Long. 72°E. at 8 hrs. of 25th. The sea at Amini Divi on the 25th was very rough. By the evening, most of the coastal stations in Malabar reported rough seas. The upper winds had further strengthened and indicated that the depression had intensified and was most likely a storm. The 8 hrs. chart of the 26th showed hurricane winds at Amini Divi from a WNW direction. The upper winds at Minicoy had further strengthened and the winds at Mangalore had more of an easterly component. The storm was centred on that morning near Lat. 11°N., Long. 73½°E. The storm was moving in an easterly direction. Amini Divi recorded 5" of rain during the preceding 24 hours and Mangalore 3". The storm crossed the coast near Calicut a little before midnight. The greatest negative departure recorded at Calicut was 0.27". After entering land the storm weakened rapidly and apparently passed as a low pressure wave into the Bay of Bengal by the morning of the 28th. The morning chart of the 29th and the observations on board the ships "Exchange", "Nyco" and "President Tyler" showed that a low pressure area was forming or had formed with central region in the neighbourhood of Lat. 13°N., Long. 85°E. With the help of "Nyco's" observations and the coastal readings the low pressure wave could be located on the 30th morning near Lat. 14°N., Long. 85½°E. The low was apparently near Lat. 15½°N., Long. 85°E. at 8 hrs. of the 31st, about 50 miles southeast of Vizagapatam on the morning of the 1st June and near Lat. 17½°N., Long. 84°E. on the 2nd. The 'low' weakened temporarily on the following day, but the cyclonic circulation in the upper air could be seen at 1.0 km. and rain was widespread

around the Bay of Bengal north of Lat. 15°N. By the evening of the 3rd, the upper winds at 0.5 km. (the only level available) at Calcutta had strengthened and backed while the upper winds at Vizagapatam had also backed in the lower levels. On the morning of the 4th the winds at Calcutta had weakened while those at Chittagong and Vizagapatma were moderate to strong. The depression could be centred at 8 hrs. of that day about 30 miles eastsoutheast of the Sandheads. Moving northeast the depression was centred at 17 hrs. near Lat. 21°N., Long. 89°E. and by midnight had become a deep depression centred near Lat. 21½°N., Long. 90½°E. The deep depression then moved eastwards and intensified into a cyclonic storm with centre at 5 hrs. of the 5th, near Lat. 21½°N., Long. 91½°E. and by 8 hrs. was passing inland between Chittagong and Cox's Bazar. Within the next five hours it had entered land and filled up rapidly.

Associated with this storm, a spell of very rainy weather prevailed over the Malabar coast, the rainfall being particularly heavy on the 27th May. In the north Madras coast Cocanada had a record rainfall of 19.7" during the 24 hours ending with 8 hrs. of the 2nd June. East Bengal and Assam experienced heavy rain from the 4th to 7th June.

The district averages and some particularly heavy falls of rain are given below.

TABLE 3.

District.	DISTRICT AVERAGES RECORDED ON			Heaviest amount reported for the past 24 hours.
	26th May.	27th May.	28th May.	
Travancore State— I. Kottayam Division.	1.9	4.5	1.9	Munnar 8.1" on 26th, Devikulam 8.9," Peermade (Taluk Office) 9.5" and Peermade (Residency) 11.7" on 27th.
Travancore State— II. Quilon Division	1.4	4.6	0.7	Punalur (Pathanapuram) 8.7", Kot-tarakara 8.7" and Aryankavu 9.5" on 27th.
Travancore State— Trivandrum Division.	1.5	1.9	0.3	
Cochin State . . .	1.4	7.8	5.2	Irinjalakuda 10.7", Trichur 10.3" and Wadakkancherry 10.1" on 27th and Trichur and Wadakkancherry 12.3" on 28th.
Malabar . . .	1.7	4.5	3.0	

TABLE 4.

District.	DISTRICT AVERAGES RECORDED ON			Particularly heavy falls.
	1st June.	2nd June.	3rd June.	
East Godavari (Plains)	2.8	5.1	1.5	Coringa 14.3" on 1st Cocanada 19.7" on 2nd. Mummidivaram 14.5" and 6.0" on 2nd and 3rd, respectively.
West Godavari (Plains).	—	2.1	—	

TABLE 5.

District.	DISTRICT AVERAGES RECORDED ON					Particularly heavy falls.
	4th June.	5th June.	6th June.	7th June.	8th June.	
Rajshahi . . .	2.5	..	..	..	..	Noangaon 7.0" on 4th.
Rangpur . . .	4.0	1.5	..	..	..	Gobindganj 15.7" on 4th.
Bogra . . .	3.4	..	..	..	..	Dubchanchia 7.3" on 4th.
Mymensingh . . .	4.0	1.9	..	..	..	Jamalpur 8.5" on 4th.
Tippera . . .	1.7	..	..	3.3	3.7	Nasirnagar 9.0" on 7th. Nasir- ranagar, Chandpur and Laksam 8.1", 8.4" and 8.2", respectively on 8th.
Sylhet . . .	3.1	1.8	1.7	4.1	..	Sylhet 17.9" and 10.8" on 4th and 7th, respectively.
Cachar . . .	..	..	3.1	5.0	..	Manmukh 7.0" on 7th.
Khasi & Jaintia Hills	5.8	8.5	2.8	2.4	..	Silchar 8.9" on 7th. Cherrapunji (Observatory) 7.1" on 4th. Cherrapunji 12.8" on 5th. Mawsynram 13.2" on 4th. Cherrapunji P. S. 12.9" on 5th. Maw- phlang and Shillong 11.1" and 8.5" on 5th, respective- ly.

With the paucity of observations from the Arabian Sea, it is not possible to trace the exact commencement of the depression. But it is without doubt an unusual cyclone in that it took an easterly direction, and crossed the coast at a very low latitude.

Taking all the observations that are available, it appears that this storm had a long travel from the day it was detected as a depression on 24th May near about Amini Divi. It weakened at times and was strongest near the beginning of its career off the Malabar coast and near its end at the head of the Bay. The path taken by the storm was very abnormal.

According to press reports the cyclone caused havoc along the Malabar coast particularly in South Malabar and Cochin trees being uprooted and crops damaged. About one hundred and ninety lives were lost and many sustained injuries.

In the absence of ships' reports or logs, it would be of interest to give the weather diaries of a few stations.

**Amini Divi. 24th.**—Weather appeared to clear till about midday when dark clouds began to set in from the SW and there was squally wind with light rain which gradually increased in intensity and there was intermittent vigorous squally wind with light to moderate rain at intervals throughout.

**25th.**—Lightning seen between 2-30 and 4 hrs., light to vigorous squally wind from SW along with either moderate rain or drizzle. Drizzling ceased at 9 hrs. Strong wind continued from SSE with intermittent thin drizzling after 9-30 hrs. Lull till about 11 hrs.; apparently the wind took around along the east at 13 hrs., the wind began blowing from WNW, force 9. At 17 hrs. it became very violent along with moderate rain. As time passed the force grew very intense with heavy rain, cadjan leaves from roofs blown off, many trees uprooted. Some houses gutted.

**26th.**—Cloudy weather. Violent gale (hurricane) with rain since previous evening which slowed down gradually after 10-30 hrs. Gale ceased at mid-day. There was intermittent vigorous squall with intermittent rain between 18-30 and 21 hrs. Lightning seen between 19 hrs. and 23 hrs.

The wind had an average speed of 44 m.p.h. between 25th and 26th while the wind speed at 8 hrs. on 26th was 70 m.p.h.

**Calicut. 26th.**—Sky overcast with ragged low clouds of bad weather and altostratus. Early morning cooler than usual. Intermittent light to moderate drizzle from 1-30 to 2-10 hrs. Owing to strong current and strong breeze "S. S. Ismailia" then lying in the port ran aground. Continuous moderate rain from 2-20 to 3-10 hrs. At about 4-10 hrs. there was a sudden squall lasting for about five minutes and blowing from SW, force 7. There was a lull in squall for about 30 minutes with break in the clouds. More or less continuous rain or drizzle began at 4-35 and went on till 16-20 hrs. Wind began to increase after 16-20 hrs. and weather became worse with the progress of the day. The Sky was ugly and threatening. There was continuous moderate rain from 16-25 to 16-45, drizzle 16-46 to 17-30 and continuous slight drizzle thereafter. At 20 hrs., wind force reached 6, direction being E and there was unusual gustiness of wind before that. The steamer which ran aground in the early hours of the morning got herself refloated under her own power and probably with the help of the easterly wind. Another steamer "M. V. Revati" got herself entangled in the cyclonic weather about 4 miles north of Chowghat and twelve miles south of Ponnani and became a wreck. By 24 hrs. the direction of wind suddenly changed from E to NW, force still remaining 6. Several trees were uprooted in the locality.

**27th.**—Sky overcast, ugly and threatening wind continued to blow with unabating velocity and ferocity, the force being 6 and the direction NW at 2 hrs., force 7 and direction NW at 4 hrs., force 8 and direction WNW at 6 hrs. accompanied by rain and drizzle. From 8 hrs. the wind force began to decrease gradually. There was terrific thunder accompanied by rain from 13-10 to 14-10 hrs., and 16-30 to 18-10 hrs. Continuous slight drizzle from 18-50 to 19-20 hrs. Wind was nearly calm thereafter and the sky gradually cleared.

**Cochin. 26th.**—Cloudy in the morning with Cu, Cb, Fb and Ac. Light rain between 2-15 and 2-30 hrs. Light showers of rain at 7-30 hrs. The sky continued heavily clouded in the forenoon with mostly Cu, Cb and Ac. Heavy showers of rain at 10-15, 10-50 and 11-25 hrs. Light showers of rain at 13-25 hrs. In the afternoon the sky became overcast with Cu, Cb and As. Light rain between 14-20 and 15-45 hrs. Heavy rain at 16-45 hrs. for about half an hour, after which light to moderate rain continued. The wind which was blowing from SSE (force 3) had also changed by 17 hrs. to SW (force 5). By 19-30 hrs. the wind began to increase in violence and was coming in great gusts from WNW (force 7) each gust increasing in force to a storm, blowing down trees, houses, etc. By 22 hrs. the wind had again shifted to WSW (force 8) still increasing in violence. No one could stir out for fear of falling trees and debris in the streets. All the roads were blocked, all communication interrupted, telegraph, telephone and electric wires broken and posts pulled down. Light to moderate rain prevailed and the terrific storm continued throughout the night creating widespread damage. The sea had become very rough and several boats capsized.

**27th.**—The storm continued to increase in violence after midnight. The rain also increased in intensity and the storm and rain continued during the early hours of the morning. Towards morning the wind had gradually changed to WNW (force 9), the rain also moderated and a light to moderate rain continued afterwards intermittently. Innumerable trees had fallen, several small houses had been blown off, and larger ones damaged; scarcely a house was left without sustaining some damage. Several lives were also lost on account of falling trees and houses, contact with broken live electric wires lying on the roads and the sinking of boats. Such a terrific storm had never occurred here within living memory.

By noon the storm began to abate in violence (WNW force 8) the force gradually decreasing during the afternoon to force 6 at 14 hrs. and force 4 at 16 hrs., and at 17 hrs. the wind was almost calm. A light to moderate rain continued intermittently till about 20-30 hrs. The sky remained overcast with a layer of thick As.

The average speed of wind from 0 hr. to 12 hrs. when the storm was at its severest was 48 miles per hour and the speed of the gusts at their highest is estimated to be about 80 miles per hour.

**3. Depression in the Bay of Bengal from the 14th to 18th June 1941.**—In the seasonal trough of low pressure over the Gangetic plain a shallow 'low' appeared over Chota Nagpur and its neighbourhood on the morning of the 13th. This low shifted southeastwards during the day owing to a general fall of pressure in the eastern parts of northeast India and by the morning of the 14th had become a depression near Saugor Island. The upper winds up to 2 km. were affected by the depression, and the evening charts of that day indicated a strengthening of the upper winds both in its eastern and western sectors. The pressure changes were slight thereafter, but by the morning of the 15th, the depression had shifted eastwards and its central region was near Lat. 22°N., Long. 90°E. on the 8 hrs. charts of that day.

Thereafter moving in a northerly direction the depression had passed inland by the evening of that day. Then it deepened and was located near Narayanganj on the morning of the 16th. Moving further northwards the depression was near Mymensingh next morning. It appears to have broken up against the Khasi hills by that evening.

The depression caused vigorous monsoon over southeast Bengal and Assam. Some conspicuously heavy falls recorded in association with the depression were 11" at Cox's Bazar on the 14th, 7" at Barisal on the 15th, 22" and 15" at Cherrapunji on the 16th and 17th, respectively, and Mankachar (Goalpara district) 14" on the 18th.

**4. Depression in the Bay of Bengal from 23rd June to 8th July 1941.**—Conditions became unsettled in the north of the Bay of Bengal on the morning of 22nd June and a feeble cyclonic circulation of upper winds could be seen at 4 km. and above. By the evening of the same day the cyclonic circulation in the upper air had descended to lower levels. By 8 hrs. of the next day a shallow 'low' was indicated on the surface chart off the Circars-Orissa coast and the upper winds up to 2 km. at Calcutta and Vizagapatam were affected by the 'low'; by 17 hrs. the upper winds at Sambalpur at 0-2 and 0-5 km. also came under its influence. The 'low' persisted there, without any further appreciable development till the 25th but became somewhat diffuse on the 26th; on that date the cyclonic circulation could be seen only above 2 km.

The diffuse 'low' lay over the north of the Bay and the adjoining portions of southwest Bengal on the 27th and on the morning of the 28th a shallow depression was indicated on the surface chart over the Sundarbans and the adjoining sea area. The circulation up to 3 km. was under the influence of the depression. The depression showed a tendency to weaken and become elongated during the day. This process continued and by the evening of the 29th it was more or less a trough of low pressure extending up to west Central India. On the morning of the 30th a small depression appeared off Chandbali at the eastern end of this trough while the tendency to the formation of another centre of circulation was apparent over the Central Provinces accompanied by a strengthening in the activity of the Arabian Sea current over the west Central Provinces, west Central India and the north Deccan. On the 1st July the former lay over Orissa, while the latter became more marked over the Central Provinces with a pronounced increase in the activity of the monsoon over the north Konkan and Gujarat. During the next 24 hours the Arabian Sea monsoon continued very active over the north Konkan, the north Bombay Deccan and Gujarat under the influence of the second low which moved to west Rajputana, while the former was not definitely indicated in the map.

By the 3rd morning pressure had risen rapidly over the Punjab and there was a strong inflow of northerly winds up to 2 km. from the Punjab to Gujarat. The morning charts of the 3rd July showed that the depression had shifted eastwards and was a well marked depression with central region between Saugor and Jabalpur. This depression moved slowly in a westnorth-westerly direction. On the morning of the 4th the depression could be centred near Brijnagar, on the 5th about 60 miles east-southeast of Ajmer and on the 6th morning about 50 miles south of Ajmer. On the 7th morn-

ing it lay over southwest Rajputana and during the next 24 hours had merged into the seasonal low over northwest India.

It brought rain which was locally heavy in southwest Rajputana and Sind. In association with the depression, both the Bay of Bengal and the Arabia Sea branches of the monsoon strengthened, causing heavy falls over a region extending from Bengal to south Rajputana, lower Sind, Gujarat and the Bombay Deccan. The rainfall was concentrated and exceptionally heavy in the coastal strip to the north of Bombay and in Gujarat; Dharampur in Surat district registered a rainfall of 39" during the 24 hours ending at 8 hrs. on the 2nd, which probably constitutes a record for a day for a low-level station in the world. The Western Ghats between Bombay and Poona also experienced very heavy downpours during the movement of this depression. Khandala had 24" of rain during the 48 hours ending at 8 hrs. on the 2nd and another 17" on the next day, thus breaking all previous records for this station. The depression gave an extension of the monsoon into Sind and stimulated it over the hills and the submontane districts of the Punjab.

The torrential rainfall associated with this depression resulted in severe floods in the rivers in the Gujarat. Railway traffic was seriously disorganized for nearly a fortnight. A passenger train is reported to have been marooned between Miyagam and Lokhadra on the B.B. & C. I. Railway, and as a result of erosion of the track to have fallen over on its side. According to newspaper reports, all telegraphic communication between Bombay and other parts of India was temporarily cut off and the telephonic service was also badly disorganized.

The excessive floods were responsible for heavy loss of live-stock and property. The districts of Broach and Surat suffered most heavily in this respect. Standing crops were lost and rich fruit gardens ruined. Several villages are also reported to have been washed away. A number of big bridges collapsed as a result of the floods. The severity of the floods may be gauged from the fact that a 60 feet iron girder of a bridge was carried about 150 feet by the floods.

The heavy rainfall over the Western Ghats resulted in land slides between Bombay and Poona and dislocated the railway traffic for 10 days. A heavy land-slip near Karjat is reported to have temporarily buried an electric locomotive at a cutting near a tunnel.

PRINCIPAL AMOUNTS.

24 Parganas : Saugor Island 7.1" (1st);  
Chittagong : Cox's Bazar 12.5" (2nd) and 11.2" (3rd).  
Ahmedabad : Dolka 10.9" (5th).  
Broach and Panch Mahals : Ankleshwar 11.7" (2nd); Vagra 10.1" (2nd);  
Surat : Surat 18.1" (2nd) and 10.9" (3rd); Mandvi 15.3" (2nd); Bardoli 13.4" (2nd), Valod 13.1", 10.6", 14.1" (1st, 2nd and 3rd, respectively); Jalalpur 14.1", 25.1" (2nd and 3rd respectively); Chhikli 21.1", 15.9" (2nd and 3rd, respectively), Bulsar 15.2" (2nd); Waghai 15.5", 16.7", 14.1" (1st, 2nd and 3rd, respectively); Ahwa 14.1" (2nd).  
East Khandesh : Jannor 11.7" (1st).  
Nasik : Trimbak 16.2" (2nd); Igatpuri 14.3" (2nd); Peind 13.9", 18.7" and 10.0" (1st, 2nd and 3rd, respectively).  
Poona : Lonavala 15.3", 10.0", 13.8" (1st, 2nd and 3rd, respectively).  
Thana : Mokda 15.5", 10.4" (2nd and 3rd, respectively); Bhiwandi 13.7" (1st); Vada 14.6", 13.6" (1st and 2nd, respectively); Dahanu 10.1" (1st).  
Kolaba : Karjat 12.1", 10.9", 13.6" (1st, 2nd and 4th, respectively);  
Matheran 14.6", 12.2", 12.5" (1st, 2nd and 4th, respectively); Roha 10.2" (1st).

**5. Severe cyclonic storm in the Bay of Bengal from 6th to 13th July 1941.**—Weather became unsettled in the north of the Bay of Bengal on the 5th, probably due to a wave of low pressure from the east, and by the next morning a depression had formed in the north-west of the Bay, with central region near Saugor Island. It moved in a northerly direction during the day and passed inland about midnight. At 8 hrs. of the 7th the central region was about 30 miles east of Calcutta, and the evening chart of that day indicated that the central region had moved further inland to the neighbourhood of Berhampore. On the morning of the 8th however the central region of the depression was about 50 miles to the southeast of Calcutta, the southward motion being apparently due to a wave of low pressure coming from the east. The veering of the surface and upper winds at Calcutta since the previous evening definitely indicated a southward motion of the depression. The southward movement continued very slowly during the day, and at the same time the depression was also intensifying. At 8 hrs. of the 9th the deep depression lay over the Sunderbans and the head of the Bay with centre about 100 miles eastsoutheast of Saugor Island. The depression further intensified during the day and was a cyclonic storm by 17 hrs. At 22 hrs. it was centred about 20 miles north of the Sandheads, which recorded the lowest pressure at that time with a surface wind of 9 B.F. from the westsouthwest. It remained practically stationary there till the morning of the 10th, and then moving westwards crossed the coast between Balasore and Saugor Island by 14 hrs. that day. The storm

weakened into a deep depression on passing inland and was centred about 40 miles eastsoutheast of Chaibasa at 17 hrs. of the same day. It then passed over the north of the Central Provinces, being centred near Pendra on the morning of the 11th and near Bhopal on the morning of the 12th. It then took a northwesterly course and was near Jodhpur that evening and had merged in the seasonal low by the next morning.

Associated with the movement of this cyclonic storm, moderate to heavy rain fell over the region extending from southwest Bengal and Orissa to east Gujarat and south Rajputana.

According to newspaper reports, the river Baitarani in Orissa was in spate as a result of heavy rainfall. The level of the river was reported to have risen by about 60 feet. Owing to breaches between Jajpur and Baitarani stations, Puri was virtually cut off from the outside world for some time.

In Gujarat, this cyclonic storm coming in the wake of the previous depression, added to the troubles of the people. There was little respite between the heavy rainfall associated with the previous depression and that caused by the present cyclonic storm. Large tracts in the districts were under flood water, and hundreds of people were rendered homeless. Reports of collapse of houses were also received. New breaches occurred in the railway lines in Gujarat. For some time telegraphic communication in Sind also was interrupted.

SPECIAL REPORT OF HEAVY RAINFALL.

Balasore : Akhayapada 13.5" (9th); Chandbali 12.7" (10th); Bhadrak 8.5" (9th).  
Puri : Khurda 8.5" (9th).  
Cuttack : Jajpur 11.8" (9th); Dharmasala 9.0" (9th).  
Singhbhum : Majhgaon 10.2" (10th).  
Amraoti : Chikalda 10.0" (12th).  
Ahmedabad : Aslali 13.8" (13th); Ahmedabad 11.4" (13th).  
Kaira : Mohmedabad 17.6" (13th); Pinglaj 16.1" (13th); Kaira 15.7" (13th); (10" in 4½ hours upto 12.30 P.M.); Matar 10.3" (13th).  
Broach and Panch Mahals : Kalol 9.8" (13th).  
Baroda : Jethpur 8" on the 12th.

**6. Depression in the Bay of Bengal from the 28th July to 1st August 1941.**—Weather became unsettled in the north Bay of Bengal on the morning of the 27th and it was seen that the fall of pressure was comparatively more marked on the Chittagong and north Arakan coasts. By 8 hrs. of the 28th a depression had formed with central region about 50 miles southwest of Cox's Bazar. Moving northnorthwestwards it passed inland on the early morning of 29th and at 8 hrs. was centred about 30 miles northwest of Barisal. Following a track which was becoming more westerly, it passed near Faridpur about noon and by the evening it had weakened further and lay over central Bengal. Thereafter it travelled westwards as an ill-marked depression, and was over Chota Nagpur on the morning of the 30th and over east Central India and the north Central Provinces on the morning of the 31st. Moving slightly westwards it filled up there by the morning of the 2nd August.

Under the influence of the depression moderate to heavy rain fell locally in Bengal and Bihar.

According to newspaper reports, on account of continuous and torrential rainfall a number of land-slides occurred in the Darjeeling district resulting in considerable dislocation of traffic over certain sections of the Darjiling-Himalayan Railway.

**7. Cyclonic storm in the Bay of Bengal from 7th to 14th August 1941.**—On the morning of the 4th a shallow low pressure area appeared extending from east Central India to the Orissa coast. The "low" shifted to the north of the Bay and, with slight oscillations, persisted there till the morning of the 7th; during this period a feeble cyclonic circulation could be seen at some of the higher levels. The morning chart of the 7th showed a fall of pressure round the head of the Bay and that rainfall had also commenced on the Orissa coast. By 17 hrs. of that day the "low" intensified into a depression with centre near Lat. 20°N., Long. 89°E. By 8 hrs. of the 8th when it was centred about 20 miles east of the Sandheads, it had further intensified into a deep depression, and the cyclonic circulation was well marked at all levels. There was a further rapid fall of pressure in the central region and without any appreciable movement, the deep depression intensified into a cyclonic storm by 13 hrs. of the same day. It was centred at 17 hrs. about 20 miles southeast of Saugor Island. Then moving west-northwestwards, the cyclonic storm had passed inland by 22 hrs. when it was centred about 20 miles southwest of Midnapore. The cyclonic storm continued to move westnorthwestwards, weakening at the same time and on the morning of the 9th it was a deep depression centred near Chaibasa. During the day the deep depression moved quickly westnorthwestwards and that evening the centre of the depression was midway between Daltonganj and Pendra. By the morning of the 10th, the centre had reached a position between Jubbulpore and Saugor Cantonment. Thereafter the



pression moved more slowly and intensified. It was centred on the morning of the 11th about 50 miles southeast of Brijnagar. There was a belt of very heavy rainfall to the south of the depression.

During the next twentyfour hours, the depression moved even more slowly than on the previous day, and weakened at the same time; at 8 hrs. of the 12th the depression was centred about 50 miles southeast of Neemuch.

The depression then took a northwesterly course and weakening further as centred 70 miles southeast of Jodhpur on the 13th morning, and 60 miles westnorthwest of Bikaner on the 14th. It disappeared during the day.

Under the influence of this cyclonic storm, the Central Provinces and Bihar received widespread and locally moderate to heavy rain between the 9th and 10th while rainfall was generally widespread and heavy in west central India, east Gujarat and southeast Rajputana between the 9th and the 14th. The depression also caused a strengthening of the monsoon in the east and north Punjab and the west United Provinces and extension of rainfall into north Rajputana and the southwest Punjab, but failed to give any rain in Sind. Some of the heaviest falls associated with the movement of this depression were—Rutlam (C.I.) 11", Ashta (C.I.) and Bammia (C.I.) 2" each and Banswara (C.I.) 11" on the 10th, Sailana (C.I.) 14" and Rutlam (C.I.) 12" on the 11th, Abu 12" and Banswara (C.I.) 11" on the 12th, Sirahi Rajputana 14" and Abu 19" on the 13th and Abu 12" again on the 14th.

The heavy rainfall caused breaches in the B. B. & C. I. Railway lines between Rutlam and Nagda and through traffic between Bombay and Delhi was temporarily interrupted. Widespread damage was also reported to the main and branch lines of the Jodhpur Railway. The Sabarmati river was also flooded and the newspapers reported considerable damage to several villages on its banks.

#### 8. Cyclonic storm in the Bay of Bengal from 15th to 22nd August 1941.

Weather became unsettled in the northeast of the Bay of Bengal on the morning of the 13th. The unsettled conditions persisted there and gave rise to a shallow low by the morning of the 14th. The low developed into a depression off the Arakan coast by 2 hrs. of the 15th. The depression deepened and was centred at 8 hrs. of the 15th about 70 miles southwest of Akyab. During the day it deepened further and probably developed into a cyclonic storm that night. The cyclonic storm moved northwards almost parallel to the coast and was centred at 8 hrs. of the 16th about 20 miles southwest of Chittagong. After reaching the neighbourhood of the Meghna estuary, the storm curved to the west and passed inland near Barisal about noon of that day. Moving westwards over lower Bengal it reached the neighbourhood of Calcutta about midnight and was practically stationary there as a deep depression till the next morning. It then weakened and moved rapidly in a westnorthwesterly direction over southwest Bengal and was centred near Daltonganj at 8 hrs. of the 18th. The depression continued to move in a westnorthwesterly direction and was centred near Allahabad that evening and near Nowgong on the morning of the 19th. It then moved in a westsouthwesterly direction and was near Guna on the 20th morning. The depression weakened considerably during the day, but the residual wave of low pressure seems to have recurved to the northeast and east and disappeared on the 22nd over the east United Provinces, after causing rainfall in the central districts of the province.

The cyclonic storm was responsible for giving widespread and locally heavy rain along and near its track. Some of the more noteworthy falls recorded were:—Himgir (Chota Nagpur) 9" on the 17th, Sailana (C.I.), Mahidpur (C.I.), Rutlam (C.I.) and Bhanpura (C.I.) 10" each and Sitamau (C.I.) 9" on the 19th.

#### 9. Land depression in northeast India from 23rd to 27th August 1941.

Weather was unsettled in the north Bay of Bengal on the 23rd. An elongated area of low pressure extending from the head of the Bay to central Bengal formed on the 24th. It was practically stationary during the next 24 hours. On the 25th it concentrated into a depression and moving northnorthwestwards was centred at 8 hrs. of the 26th about 40 miles south of Malda. It then moved westnorthwestwards and was centred at 17 hrs. of the 26th about 30 miles southeast of Sabour in Bihar. At 8 hrs. of the 27th, it was centred about 20 miles south of Darbhanga and had become shallow. The depression filled up by the next morning.

This depression gave copious rainfall over Assam, Bengal and Bihar. This rainfall was reported to have greatly benefitted the standing crops in Bihar.

#### 10. Land depression from 30th August to 2nd September 1941.

A shallow depression formed over south Bihar during the 30th August, centred in the evening about 30 miles west of Sabour and developed during the next day without much change in the position. It then moved westnorthwestwards and was centred on the morning of the 1st September about 50 miles east of Benares. The shallow depression then intensified slightly and was centred near Lucknow on the 2nd. The depression weakened during the day and had filled up by the next morning.

During the course of its movement, the depression caused widespread and locally heavy rain in Assam, Bengal, Bihar and the east United Provinces

and stimulated the monsoon over the region from the west United Provinces to the extreme north of the country.

#### 11. Depression in the Bay of Bengal from the 6th to 13th September 1941.

In association with a low pressure wave moving westwards through central Burma weather became unsettled in the north Bay of Bengal on the morning of the 6th. At that time the upper winds between 1 and 4 kms. over the north and central Bay of Bengal formed a closed circulation, which became more marked by that evening. At 8 hrs. of the 7th a shallow depression was noticed to have formed with central region near Lat. 20°N., Long. 89°E. Moving northwestwards and intensifying slightly the depression was centred at 17 hrs. of the same day about 50 miles southsouthwest of Saugor Island. The depression then moved westnorthwestwards and crossed the Orissa coast by 2 hrs. of the 8th, and was centred on the morning of the same day near Chaibasa. It then took a westnorthwesterly course over the north of the Central Provinces, being centred between Ranchi and Pendra on the 9th morning and about 50 miles east of Guna on the morning of the 10th. It weakened thereafter and travelling in a northwesterly direction over Rajputana, was centred near Bikaner on the morning of the 11th and disappeared over the southwest Punjab on the 12th.

In association with this depression there was widespread and locally heavy rain in northeast India between the 7th and 9th, in the United Provinces and Central India between the 8th and 10th and in the east and north Punjab and Kashmir between the 10th and 12th. Some of the noteworthy falls were:—Bawal (east Punjab) 8" and Mirpur (Kashmir) 8" on the 11th.

According to press reports, the heavy rainfall in the north Punjab and Kashmir was attended with floods in the Jhelum river resulting in loss of agricultural property in the Shahpur district of the Punjab and the southern districts of Kashmir. The floods also submerged a number of villages in these districts and caused serious damage to the Jammu-Srinagar road.

#### 12. Depression in the Bay of Bengal from 12th to 20th September 1941.

A wave of low pressure advanced into the Bay from the Gulf of Siam on the 10th and gave rise to unsettled weather over the central Bay on the 11th. Within the next 24 hours a depression formed off the Circars coast, with central region at 8 hrs. of the 12th near Lat. 15°N., Long. 84°E. Moving in a northwesterly direction the depression was centred at 17 hrs. of the same day about one hundred and fifty miles eastsoutheast of Masulipatam and on the morning of the 13th about 100 miles east of the same station. By this time fairly widespread rain had fallen in the Deccan and the north Madras coast. At 17 hrs. of the 13th the depression appeared to have become diffuse and was hardly noticeable on the surface chart, but the upper winds of Madras and Vizagapatam indicated that the central region of the depression was about one hundred miles southeast of Masulipatam. The residual low passed inland and lay on the morning of the 14th over the Deccan. It persisted there during the next two days strengthening the Arabian Sea monsoon which extended into the Peninsula, Central India and the Central Provinces. The 'low' then moved north and northeast and passing over the Central Provinces and Chota Nagpur, lay over north Bihar on the 20th; it broke up against the Himalayas during the day.

In association with this low pressure wave there was local to fairly widespread rain in the north of the Peninsula, the central parts of the country and Bihar.

#### 13. Depression of 3rd to 5th October 1941 in the Arabian Sea.

Weather became unsettled along the Malabar-Konkan coast and widespread rain fell there on the 2nd. The morning chart of the 3rd indicated that a depression had formed with centre about 150 miles west of Marmagao. The depression moved in a northwesterly direction and was about 200 miles west of Ratnagiri on the morning of the 4th and about 350 miles west of Bombay on the morning of the 5th. It did not affect the Indian weather thereafter. Owing to lack of ships' observations no further details are available regarding this depression.

Associated with this depression there was nearly general rain along the west coast on the 3rd and local rain there on the next two days. Honavar reported 3", Manjeri 5" and Kuthiyadi 6.5" on the 3rd. The rainfall also extended on the 4th to the Gulf of Cambay and south Kathiawar.

As usual the passage of this depression in the Arabian Sea gave rise to high temperatures over southern Sind due to desert winds being drawn into lower Sind. The easterly circulation set up by the depression persisted even after the 6th, possibly under the influence of another low pressure wave from the Bay. The record temperature of 109°F. was observed at Drigh Road on the 8th of October.

#### 14. Depression in the Bay of Bengal from 4th to 12th October 1941.

Weather became unsettled in the south Bay of Bengal on the morning of the 3rd and a depression formed there during the day. The central region was probably near Lat. 7°N. Long. 87½°E. on the morning of the 4th and near Lat. 9°N. Long. 84½°E. at 8 hrs. of the 5th indicating a northwesterly motion. Subsequently the depression moved northwestwards and at 8 hrs. of the 6th it was 80 miles eastnortheast

of Madras. Then it moved slowly northwards and later recurving towards northeast more or less parallel to the coast line it was centred 60 miles eastsoutheast of Masulipatam at 2 hrs. of the 7th. After crossing the coast near Cocanada at about noon of the same day it was centred at 8 hrs. of the 8th about 20 miles north of Jagdalpur. The next morning it was near Ranchi and on the same evening 70 miles eastsoutheast of Ranchi. Later it moved northeastwards and lay over central Bengal with centre near Berhampore on the 10th. Thereafter without any appreciable change in position the depression began to weaken and became unimportant by the 12th morning.

Associated with deep depression there was unusually wet weather over the eastern parts of the Peninsula and over the greater part of northeast India. According to press reports there were disastrous floods in the Burdwan and Hooghly districts which caused considerable loss of cattle extensive damage to houses and crops and breaches of railway lines between Calcutta and Madras.

The following are some of particularly heavy falls of rain :—

Murshidabad : Akriganj 10·2" (10th).

Midnapore : Contai 11·1" (9th); Mohanpur 10·0" (8th).

Rajshahi : Rajshahi (Observatory) 11·4" (10th).

Vizagapatam : Bimilipatam 10·5" and Vizagapatam 9" (7th).

Khasi & Jaintia Hills : Mawphlang 10·2" (11th).

Balasore : Balasore (Observatory) 12·7" (8th).

Ranchi 9" (9th).

**15. Bay Depression of 14th to 19th November 1941.**—A trough of low pressure appeared off the east coast of Ceylon at 17 hrs. on the 13th. It moved northnorthwestwards and lay off the Ceylon-Madras coast at 8 hrs. on the 14th. By 17 hrs. of the same day the trough concentrated into a depression centred near Lat. 12°N. Long. 83°E. From this position it continued to move northwards till 5 hrs. of the 16th when it was centred near Lat. 15°N. Long. 83°E. The depression then remained practically stationary till the 18th morning; afterwards it began to move in a northeasterly direction. At 22 hrs. of the 18th it was centred near Lat. 16°N. Long. 84°E. Then moving eastwards it was centred at Lat. 16°N. Long. 85°E. at 8 hrs. on the 19th. It weakened during the day and became unimportant by 8 hrs. on the 20th.

Associated with this disturbance there was abundant rainfall in south-east Madras and along the north Madras coast. Widespread and locally heavy rainfall occurred in Orissa, Chota Nagpur and Bengal and rainfall also extended into lower Assam. The noteworthy amounts of rainfall are :—Madras 6" on the 13th Nellore 9" on the 14th and Burdwan 4" on the 18th.

**16. Severe storm in the Bay from 29th November to 6th December 1941.**—Weather became unsettled in the south of the Bay on the morning of 29th November and by 1 hr. I.S.T. on the 30th a depression had formed centred near Lat. 8°N. Long. 87°E. Moving in a northwesterly direction and becoming deep it was centred near Lat. 9½°N. Long. 84°E. at 8 hrs. on the 1st December. It continued to move in the same direction and by 8 hrs. on the 2nd intensified into a cyclonic storm with its centre near Lat. 10½°N. Long. 82½°E. It then became severe and at 14 hrs. on the same day was centred near Lat. 11½°N. Long. 82°E. It then took a westerly course and crossed the Coromandel coast over Cuddalore about midnight of the 2nd.

Moving over land in a westerly direction as a depression through Salem and south Mysore it passed into the Arabian Sea off Kanara during the night of the 3rd. At 8 hrs. of the 4th the depression was deep and was centred near Lat. 12°N. Long. 73°E. Continuing to move in a westerly direction the depression was centred near Lat. 12½°N. Long. 69°E. on the 5th morning and near Lat. 12½°N. Long. 65°E. on the 6th morning. After 17 hrs. of the 6th the depression could not be traced as it went outside the Indian area.

The weather diary of the Cuddalore Observatory for 2nd and 3rd December is given below :—

**"2nd December 1941.**—Sky remained heavily clouded to overcast from 0 hr. with variable moderate and slight drizzle 0·50/1·20 hrs. In the early morning it remained overcast with a gentle to moderate N.W. breeze. Intermittent breeze 0740 to 0759 hrs. intermittent light rain 0925 to 0950 hrs. Intermittent drizzle prevailed from 10·30 to 13·55 hrs. followed by continuous rain from 14·10 to 14·35. Breeze began to gather in force after 14·30 hrs. and at 17·0 hrs. it was blowing at 18 m.p.h. Continuous rain 1520 to 17·15 hrs. and again continuous but variable drizzle and rain from 19·20 to 22·00 hrs. and at 22·50 to 24·00 hrs. Wind continued to rage throughout the night, sky overcast. Some of the branches of the trees began to break or fall after 22·00 hrs. (The barometer recorded at 22·00 hrs. was 29·500/70" (not corrected). Air temperature 74·7°. Wind force 5. (B. No.) upto midnight NW breeze prevailed.

**3rd December 1941.**—There was a lull before the storm i.e., after 0 hrs. and before 1·20 hrs. the wind force at 1 hr. was at about 2·4 m.p.h. (After 1·20 hrs. there was a sudden rush of wind preceded by drizzle which developed

into rain and within 5 minutes or so the storm set in). The wind direction from the South. (It was so strong that some of the glasses fixed to wooden frames on the walls began to fall down one by one, branches; trees swayed, wind was coming in waves with a roaring noise, overhead. Office doors (facing south) could not be closed easily. The force of wind was such after 02·30 hrs. that an office table, which barricaded a door, was pushed aside and doors flew open. The trees in the office compound outside were broken. Calicut tiles were also removed from the roof. The reading of the barometer at 1·58 hrs. 29·072"/77°—uncorrected. It was not possible to walk in the verandah of the office). It was not possible to state if there was continuous rain between 01·20 to 4·20 hrs.; falling of rain water was only heard; the wind grew less in intensity after 6 hrs. and 9 hrs. moderate breeze prevailed. Intermittent rain 8·15 hrs. light intermittent drizzle 09·15 to 9·18 hrs. Sky continued to be overcast; variable intermittent rain and drizzle 13·40 to 14·10 hrs. Sky remained overcast till 12 hrs. then clouds cleared, high cloud with light sunshine prevailed thereafter. During the course of the storm the maximum pressure deficiency noted was 0·81 at Cuddalore at 2 hrs. I.S.T. on the 3rd December."

According to newspaper reports the severe cyclonic storm caused widespread havoc in the North and South Arcot and Cingleput districts of the Madras Presidency. The South Indian Railway was dislocated due to extensive breaches and damages to bridges at various places and considerable loss to human and cattle life, especially in Cuddalore town and surroundings, was reported. Madras City itself experienced some damage due to the strong winds, and there was loss of a few lives due to collapse of houses and falling of trees.

Associated with this storm, there was widespread heavy rain in south-east Madras and the adjoining parts of the north Madras coast and widespread and locally heavy rain in the southern part of the Peninsula. Chidambaram recorded 12" of rain, Ootacamund 6", Madras 5" and Kodakal 4" on the 2nd.

**17. Cyclonic storm in the Bay of Bengal from 8th to 15th December 1941.**—This disturbance originated as a depression to the south of the Nicobar Islands on the afternoon of the 8th December 1941 when its central region was probably near Lat. 7°N., Long. 92½°E. It moved in a northnorthwesterly direction and at 8 hrs. of the 9th, was centred near Lat. 9°N., Long. 91½°E. and at 8 hrs. on the 10th near Lat. 10°N., Long. 91°E. Moving in the same direction it probably intensified into a cyclonic storm by 17 hrs. of the 10th when it was centred at Lat. 12°N., Long. 90°. It then moved in a westnorthwesterly direction and at 8 hrs. on the 11th was near Lat. 13°N., Long. 89°E. and by 17 hrs. its central region was near Lat. 13½°N., Long. 87°E. It then moved westwards and was centred near Lat. 13½°N., Long. 85½°E. on the morning of the 12th and near Lat. 13½°N. Long. 81½°E. on the morning of the 13th. It crossed the Coromandel coast about 30 miles north of Madras, at 13 hrs. on the same day, by which time it had weakened into a depression. It then moved over land in a westerly direction and entered the Arabian Sea across the Kanara coast at 8 hrs. on the 14th. Continuing its westerly movement, it was probably centred near Lat. 12°N., Long. 70°E. at 8 hrs. on the 15th and became unimportant later.

Though no severe weather was experienced over land due to this storm due to its rapid weakening near the coast, hurricane winds and very heavy seas seem to have been experienced on the 13th, 40 to 50 miles away from the coast as is seen from the following extract from letter No. 3209, dated 31st December 1941 from the Deputy Port Conservator, Madras :

".....Although this storm was a severe one, nothing like the weather which we anticipated was experienced at Madras. The maximum velocity of the wind during the whole storm was 45 miles per hour at 9·15 a.m. on the 13th, direction WSW; although the seas were very rough on the 13th they were not so severe as the proximity of the storm led me to anticipate. I was informed verbally that a steamship experienced really severe weather with hurricane wind and very heavy seas about 40 or 50 miles off the coast on December 13th....."

It thus appears to have developed into a severe storm of probably a small core in the Bay but lack of data out at sea renders it impossible to estimate when it became severe and when it weakened.

Associated with this cyclonic storm, wet weather set in over the east coast of the Madras Presidency on the 12th and there was widespread rain on the 13th and 14th over the region extending from Masulipatam to Cuddapah to Tinnevely and Malabar in the extreme south.

## WESTERN DISTURBANCES.

Western disturbances were active for about a month from the first week of January, in March and in May. During January and March they took comparatively southerly course and in May an unusually southerly course causing a spell of abnormally wet weather and induced active secondary over Gujarat or the central parts of the country. During the rest of the year the disturbances were comparatively feeble.

A list of disturbances (fifty-nine in number) together with a brief summary of the precipitation caused by them is given in Table 6. Details of individual



dual disturbances are given in the Monthly Weather Reports for the different months.

TABLE 6.

Nature of precipitation caused by the western disturbances.	Number of western disturbances.											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Widespread .	4	1	3	1	2	0	0	0	0	0	1	1
Local or scattered.	2	3	1	4	3	0	0	0	0	0	0	0
Little or no rain.	5	3	5	4	2	0	0	0	0	0	7	7
No. of disturbances each month.	11	7	9	9	7	0	0	0	0	0	8	8

Total number of western disturbances during the year 1941 . 59.

Descriptions of the more important western disturbances are given below :—

**Western disturbance of 15th to 19th January 1941.**—On the 14th January a western disturbance was noticed over Iran, where pressures were falling rapidly. On the 15th morning it was over Baluchistan and on the next day a secondary low appeared over north Gujarat and southwest Rajputana, while the main disturbance was still over the north west frontier. The low over Gujarat and southwest Rajputana was well-marked at 0.5 and 1.0 km. levels, Jodhpur winds being strong southeasterly and Bhuj winds moderate northerly. On the 16th, the main disturbance lay as a depression over the central Punjab, while the low over north Gujarat

and southwest Rajputana was diffuse. By the 18th, the depression over the Punjab had passed away northeastwards across the western Himalayas, but the secondary low re-appeared over central Rajputana. It filled up on the next day.

This disturbance, together with its secondary, was responsible for widespread precipitation over the tract of country from the North-West Frontier Province to the west Central Provinces and the east United Provinces.

**Land depression of 24th to 30th January 1941.**—A shallow land depression was induced over the north Deccan on the morning of January 24th in association with a western disturbance passing across more northerly latitudes. It extended over the north Deccan by next day, moved into the east Central Provinces on the 29th and became unimportant on the 31st January. It caused thundershowers which were local in character in the region Nagpur-Allahabad to Cuttack—Dacca between the 25th and 28th and widespread over Chota Nagpur, Orissa, Bengal and Bihar on the last few days of the month.

**Shallow low pressure area over land—9th to 11th February 1941.**—A shallow low pressure area was induced over Central India on February 9th, by a western disturbance. This moved away east-northeastwards during the next two days. Associated with this, there was widespread precipitation in Central India and north Hyderabad on the 8th.

**Western disturbance of 8th to 12th December 1941.**—On the 7th morning, pressures were falling rapidly over the head of the Persian Gulf and had also commenced falling over Iran and Baluchistan. By the next morning, the disturbance began affecting the northwest frontier and on the 9th morning a depression appeared over Sind and the southwest Punjab; the pressure deficiency at the centre was about 0.3". The depression moved northeastwards through north Rajputana and the east and north Punjab and passed away by the 12th.

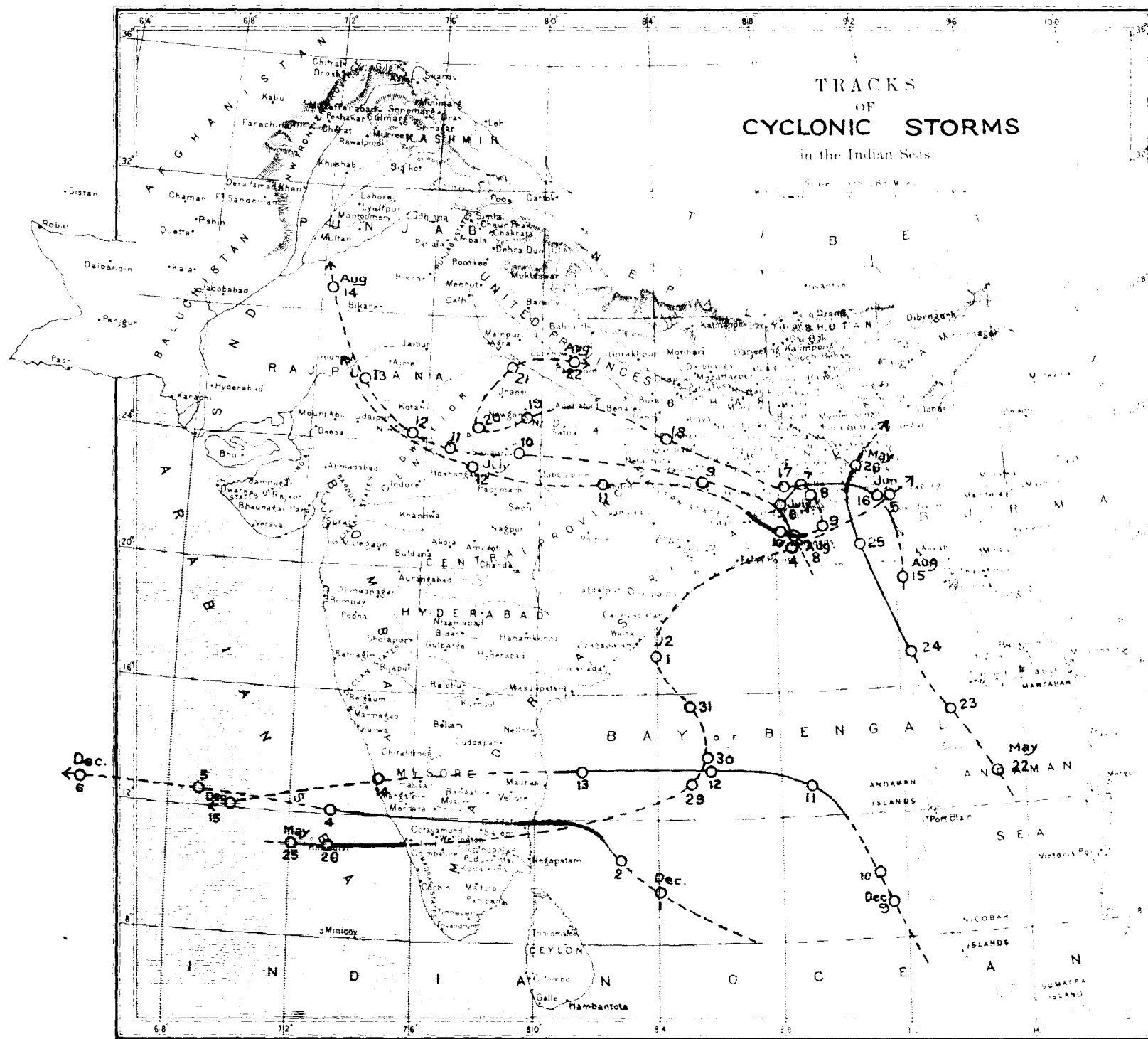
The disturbance caused fairly widespread precipitation over most parts of northwest India, Dalhousie recording 3" on the 10th. It was followed by a moderate cold wave over the region from the northwest frontier to the United Provinces and Central India.

## LOCAL STORMS.

Of the local storms reported in newspapers the following are noteworthy :—

Place.	Date.	Time.	Character of storm.	Loss of human life.	REMARKS.
Serampore (Bengal) . . . . .	19th January 1941	Evening .	Thunderstorm .	..	Some trees uprooted. One of the trees damaged a mosque.
Karchhana (Allahabad) . . . . .	29th January 1941	..	Hailstorm .	..	Caused considerable damage to crops.
Brahmanbaria (East Bengal) . . . . .	16th February 1941	1 p.m. .	Hailstorm .	..	A number of cattle and birds killed. A large number of country boats was reported to have capsized in the rivers. Rabi crops destroyed.
Villages under Sitakunda and Doublemorrings Police Stations (Chittagong, Bengal).	17th February 1941	Afternoon .	Thunderstorm .	3	About 100 houses blown away. Three persons reported to have been killed and many wounded. Injury was considerable.
Birunek and Bhairab Bazar (East Bengal).	19th February 1941	..	Hailstorm .	4	Did considerable damage to property. Uprooted many big trees.
Amraoti (Berar) . . . . .	22nd February 1941	Evening .	Violent duststorm	..	Uprooted trees, dislocated traffic and caused considerable damage to 'rabi' crops.
In and around Dholka (Eastern Kathiawar).	24th February 1941 and 25th February 1941.	..	Hailstorm .	..	Heavy damage was sustained by tobacco, gram and mango crops.
Jubbulpore (West C.P.) . . . . .	2nd March 1941	Night .	Hailstorm .	..	Caused serious damage to standing crops. A number of cattle were killed and villagers injured by hail. A number of houses collapsed and trees uprooted.
Khedbrahma, Idar, Vadali, Himatnagar and other places in Idar State (Gujarat).	4th March 1941	Evening .	Hailstorm .	..	Khedbrahma bridge and temples, dharamshallas and other buildings, situated on hills and elevated plateaus damaged and several trees uprooted.
Sylhet (Assam) . . . . .	8th April 1941	Night .	Nor'wester .	..	Caused extensive damage to standing crops. Many trees uprooted and houses blown away. It was reported that one composite bogie of the Down Surma Mail was derailed near Sreemangal on the A. B. Railway.
Mymensingh (Bengal) . . . . .	8th April 1941	Evening .	Thunderstorm .	..	Some houses were blown away and some villagers were injured.
Tangail (East Bengal) . . . . .	8th April 1941	Evening .	Heavy hailstorm	..	Many persons and cattle injured and houses damaged.
Birbhum (West Bengal) . . . . .	18th April 1941	Afternoon .	Nor'wester .	..	Many houses demolished. Corrugated and thatched roofs of several hundreds of houses blown away and hundreds of big trees uprooted. Several persons were injured.
Sirajganj (Bengal) . . . . .	23rd April 1941	Evening .	Nor'wester .	..	Many trees uprooted and tin shades and thatched walls blown away. Electric wires snapped at several places.
Bidyakot (Tipperah, Bengal) . . . . .	26th April 1941	Evening .	Nor'wester .	..	Many huts and trees came down. Heavy damage was caused to the mango crop.
Agartala (Bengal) . . . . .	26th April 1941	Dusk .	Nor'wester .	..	Caused much damage to property.
Narayanganj (East Bengal) . . . . .	26th April 1941	Evening .	Nor'wester .	..	Several light posts broken and some big trees uprooted.
Noakhali (East Bengal) . . . . .	27th April 1941	Night .	Nor'wester .	1	Destroyed a number of huts. A man reported to have lost his life as a result of a tree falling on him.
Munshiganj (Dacca) . . . . .	27th April 1941	Afternoon .	Thunderstorm .	..	A number of country boats sank in the river near the town.
Comilla (East Bengal) . . . . .	28th April 1941	Evening .	Thunderstorm .	..	Many trees uprooted, causing damage to electric lines.
Near Boga Station between Barisal and Patuakhali.	28th April 1941	Midnight .	Nor'wester .	..	R. S. N. Co.'s passenger steamer 'Mekla' (147 tons) sank and a number of casualties were reported.
Chinsurah (Bengal) . . . . .	28th April 1941	Night .	Thunderstorm .	..	Caused dislocation of street lights.
Bangalore (Mysore) . . . . .	29th April 1941	..	Thunderstorm	..	Caused a number of casualties and damage to property.
Faridpur (East Bengal) . . . . .	7th May 1941	Evening .	Thunderstorm	..	Caused damage to some houses and uprooted many trees.

Place.	Date.	Time.	Character of storm.	Loss of human life.	REMARKS.
Sirajganj (Bengal)	9th May 1941	10-30 p.m.	Nor'wester	1	Many houses demolished and trees uprooted. A person was killed and another severely wounded.
Bogra (Bengal)	9th May 1941	10 p.m.	Nor'wester	..	A large number of trees was uprooted, roofs of houses blown off and telegraph lines damaged. Considerable damage caused to mango and jack fruits.
Agra (U.P.)	11th May 1941	Night	Severe sandstorm, followed by shower and hail.	..	Many thatched and corrugated roofs blown off.
Lucknow (U.P.)	12th May 1941	Afternoon	Hailstorm	..	Some trees uprooted and in some places the electric supply cut off.
Noakhali (East Bengal)	12th May 1941	Morning	Thunderstorm	..	Corrugated roofing of some shops blown away. Several private dwelling houses also damaged. Three persons injured.
Nilphamari (Rangpur, Bengal)	12th May 1941	Morning	Thunderstorm	2	Many houses blown away and trees uprooted. Two men were reported to have been killed by falling houses.
Asansol (Bengal)	12th May 1941	Night	Thunderstorm	..	A large number of trees uprooted, corrugated roofs of houses blown off and telegraph posts knocked down.
Darbhanga (Bihar)	12th May 1941	Night	Severe thunderstorm.	..	Huts and tin sheds blown away and trees uprooted. Considerable damage done to mango crops.
Multan (Punjab)	13th May 1941	Night	Duststorm, followed by rain.	..	A large number of trees uprooted and sheds of several shops blown off, causing dislocation of traffic. Corn lying in field was damaged.
Bareilly (U.P.)	13th May 1941	Afternoon	Thunderstorm	..	Many trees uprooted and telegraph and other communications interrupted.
Gaya (Bihar)	13th May 1941	Afternoon	Severe thunderstorm.	1	Trees uprooted and several roofs blown off. Electric wires snapped and telephonic and telegraphic communications interrupted. An old woman was reported to have been crushed under a wall which fell over her.
Noakhali (East Bengal)	14th May 1941	Morning	Thunderstorm	..	Several shops badly damaged. As a result of damage to a boat on the river side, some persons received injuries.
Dinajpur (Bengal)	15th May 1941	Morning	Thunderstorm	..	Many trees uprooted and thatched and tin roofs of many houses blown away. Some persons injured. Mango and jute crops greatly damaged.
Feni (East Bengal)	26th May 1941	..	Thunderstorm	1	Hundreds of villagers rendered homeless. A young girl died as a result of a house collapse.
Nilphamari (Rangpur, Bengal)	27th May 1941	Night	Severe thunderstorm.	..	About 100 houses blown down and a large number of big trees uprooted.
Manbhum District (Chota Nagpur)	30th May 1941	..	Thunderstorm	..	Caused damage to houses and property, uprooted trees and interrupted telegraphic and telephonic communications between Ranchi and Purulia. Four empty goods wagon at Gourinathdham Railway Station went off the rails and capsized.
Jalpaiguri (Bengal)	6th June 1941	Evening	Thunderstorm	..	A number of houses was destroyed and a few people injured.
Srinagar (Kashmir)	15th July 1941	Night	Thunderstorm	..	Many houses were damaged. Four persons injured when a tree fell on a tonga. Breakages of electric, telegraph and telephonic wires.
Joynagar (24 Parganas, Bengal)	9th October 1941	1 p.m.	Thunderstorm	..	Caused serious damages to houses and trees.

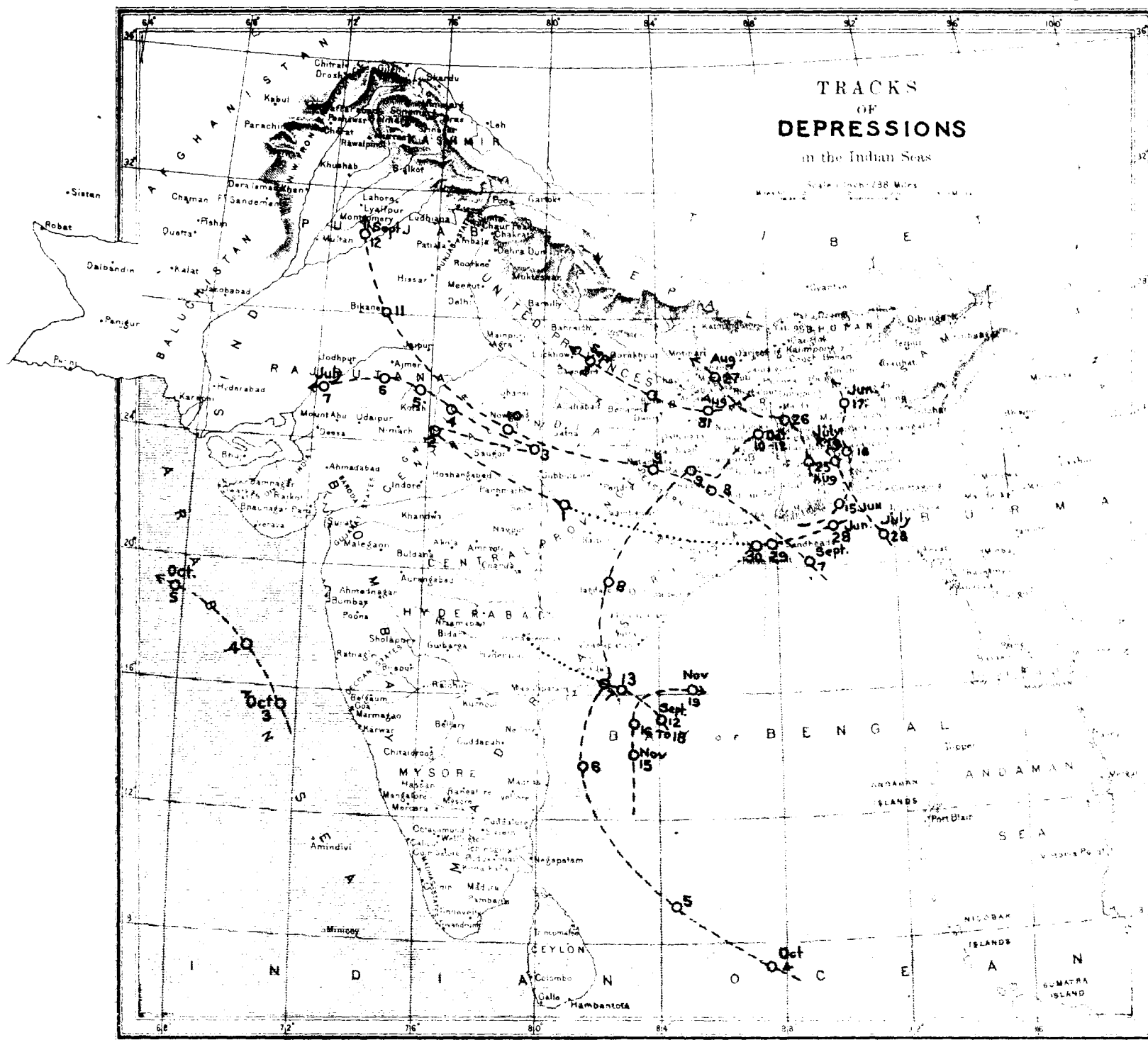


REF. No. 1454 E 37.1,500-1,100'38-1,100'39-1,100'40-1,100'41.

ENLARGED FROM S. I. C. 1941

CIRCLE INDICATES POSITION OF CYCLONE OR DEPRESSION AT 8 HRS.

----- Depression.      ——— Storm.      ——— Severe Storm.



CIRCLE INDICATES POSITION OF DEPRESSION AT 8 HRS.

..... Ill defined low.

----- Depression.